

Official

#10/Recons

RECEIVED  
4-24-03

Attorney's Docket No. 018775-765

Patent

MAILED

5/1/03

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of )  
Keisuke HASHIMOTO et al. ) Group Art Unit: 2623  
Application No.: 09/408,366 ) Examiner: Mehrdad Dastouri  
Filed: September 29, 1999 ) Confirmation No.: 3976  
For: IMAGE-PROCESSING APPARATUS ) VIA FACSIMILE

RESPONSE

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

The Examiner is thanked for the courtesy of the interview granted Applicants' attorney on April 21, 2003. At the interview, the Examiner inquired as to the support for the amendments to claim 1 defining the sub-pixels as including multi-level densities. In response, the Examiner's attention is directed to the specification at page 13, line 24 through page 14, line 1, wherein it states that the density level of each sub-pixel is represented by the height of the black line in Figs. 6-9. Fig 8 illustrates nine different heights of the black lines, thus representing nine different levels of density. Each square in Figs. 6-8 represents four sub-pixels. See page 13, lines 20-24.

However, the present invention is not limited to the disclosed preferred embodiments.

In response to the interview and the Official Action dated January 27, 2003, the Examiner is respectfully requested to reconsider and withdraw the outstanding rejections of the application.



Application No. 09/408,366  
Attorney's Docket No. 018775-765  
Page 2

Claims 1-3 and 5-19 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,862,257, hereinafter *Sekine*, in view of U.S. Patent No. 6,408,109, hereinafter *Silver*. This rejection was made in the previous Official Action, and has been addressed at length in the Amendment filed on November 15, 2002. The Examiner's familiarity with the response filed on November 15, 2002 is assumed.

In response to the rejection made on July 17, 2002, claim 1 was amended to clarify that the density level determining circuit determines multi-level density levels in the plurality of sub-pixels in the target pixel. Thus, according to the image processor of claim 1, the target pixel is divided into sub-pixels, and each of the sub-pixels is expressed with multi-level density data. At that time, Applicants pointed out that although *Sekine* discloses a target pixel that is composed of a plurality of sub-pixels, the sub-pixels in *Sekine* are expressed as binary data, not as multi-level data.

In the Official Action dated January 27, 2003, the Examiner challenges this position and alleges that *Sekine* does teach that the sub-pixels have multi-level density levels. In support of this position, the Examiner refers to Figures 3, 6, and 15. In Figure 3, each raster data D1- D6 relates to a respective pixel (not sub-pixel). Accordingly, Figure 3 does not teach or indicate that the sub-pixels are defined with multi-level density data.

With regard to Figure 6, each of the blocks P1-P6 refers to a specific pixel that includes nine sub-pixels. As is indicated in Figure 6, the sub-pixels have density data of either 0 or 1. The Examiner's attention is directed to the bottom margin of Figure 6, wherein it indicates that the box with diagonal lines represents either 1 or 0. Accordingly, Figure 6 also does not indicate that the sub-pixels comprise multi-level density data.

Application No. 09/408,366  
Attorney's Docket No. 018775-765  
Page 3

The last Figure relied upon by the Examiner, Figure 15, also does not support the Examiner's position. In Figure 15, the large box at the left portion of the figure represents respective pixels. The smaller grid at the right side of Figure 15 indicates sub-pixels for each pixel. The Examiner refers to the caption in the bottom right portion of Figure 15 wherein it indicates a density value (0 to 255) of each pixel is inputted. However, as indicated in the associated text, the density value range of 0 to 255 relates to the pixel, not to the sub-pixels. Accordingly, nowhere in the teachings of *Sekine*, and in particular with respect to the cited portions of Figures 3, 6, and 15 is there any teaching or suggestion that the sub-pixels are expressed with multi-level density data. Furthermore, the Examiner's attention is directed to Figures 5D and 10B, and column 10, lines 8-12, wherein it clearly indicates that the sub-pixels may be either white or black.

In view of the fact that *Sekine* does not teach or suggest that the sub-pixels of each pixel are defined with multi-level density data, *Sekine* does not teach or suggest the density level determining circuit of claim 1. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 1.

Similar issues also apply to method claim 15, which was also previously amended to define a step of determining multi-level density levels in a plurality of sub-pixels in the target pixel in accordance with the density of the target pixel and the discriminated edge direction of the target pixel. As discussed above, *Sekine* uses binary data to define the sub-pixels, and thus does not teach or suggest a target pixel comprising a plurality of sub-pixels defined with multi-level density data. Accordingly, claim 15 is also patentable over *Sekine* and *Silver*.

Application No. 09/408,366  
Attorney's Docket No. 018775-765  
Page 4

Claims 2, 3 and 5-14 depend from claim 1, and claims 16-18 depend from claim 15. The dependent claims are patentable over the applied art at least for the reasons set forth above with respect to claims 1 and 15.

With regard to claim 19, Applicants submit that the applied prior art does not teach the claimed combination. In particular, Applicants submit that *Sekine* does not show or suggest a density controller which sets density setting level parameters for each of the sub-pixels. To better understand the density controller which sets density setting level parameters, the Examiner's attention is directed to the specification wherein a preferred embodiment is disclosed. Specifically, in the exemplary preferred embodiment, the density level controller 14 generates a parameter signal for controlling the center of gravity in a density in the pixel and a unit of the sub-pixel obtained by dividing the target pixel in the main scan direction. The density level setter 18 controls the density level for the data corrected by the gamma correction circuit 16 by using the density control parameter signals generated by the density level controller section 14 so as to change the center of gravity and density in the pixel. Accordingly, in one embodiment, the density level controller 14 corresponds to the claimed density controller circuit which sets density level setting parameters. And, the density level setter 18 corresponds to the claimed density level setter circuit. For a detailed discussion of these preferred embodiments, the Examiner's attention is directed to page 9, line 5 through line 23, for a discussion of the density level controller 14 and the density level setter 18. The application of the density level controller 14 and the density level setter 18 is explained in the specification beginning at page 13, line 18, and in Figures 6-9.

Application No. 09/408,366  
Attorney's Docket No. 018775-765  
Page 5

However, the present invention is not limited to the preferred disclosed embodiments.

With regard to the claimed density controller circuit, the Examiner refers to Figures 5C, 5D, 50C, 50D, and Figures 15-17 of *Sekine*, as well as to column 9, lines 42-53, column 16, lines 63-67, column 17, and column 18, lines 1-5. However, it is not clear what parameters, if any, are set by the portions of *Sekine* identified by the Examiner. In the event that the Examiner persists with the rejection of claim 19, the Examiner is respectfully requested to identify with specificity what parameters are set by the structure identified by the Examiner. Furthermore, it is noted that the Examiner has referred to a fairly large section of *Sekine*. For the purpose of furthering developing the issues, the Examiner is respectfully requested to narrow the description of what the Examiner believes is the density level setting parameter portion of *Sekine* so that an appropriate response can be made.

Absent a more specific explanation of the rejection of claim 19, the Examiner is respectfully requested to reconsider and withdraw the outstanding rejection.

Claims 4 and 20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Sekine*, further in view of *Silver*, and U.S. Patent No. 5,257,116, hereinafter *Suzuki*. Claim 20 defines an image processor which includes, among other elements, an edge judgment circuit which cancels a discriminated edge direction when the density level of a pixel adjacent to the target pixel in the edge direction is larger than a threshold value. The Examiner alleges that *Suzuki* teaches an edge direction detecting circuit that cancels the discriminated edge direction when the density level of a pixel adjacent to the target pixel

Application No. 09/408,366  
Attorney's Docket No. 018775-765  
Page 6

and the edge direction is larger than a threshold value. The Examiner refers to column 6, lines 18-54 and Figure 7.

However, the Examiner has not fully appreciated the teachings of *Suzuki*. According to *Suzuki*, an edge value is calculated by the formula set forth in the center portion of column 6. The edge value is compared with a threshold value TH. However, the edge value is not the density level of a pixel adjacent to the target pixel. Specifically, the edge value is a complex computation based on the absolute value of the difference between densities of respective rows or columns of pixels. Thus, although the density of individual pixels is utilized in the edge value computation, the resulting value which is compared against the threshold has absolutely no correlation to the specific density of any particular pixel. Thus, it cannot be said that *Suzuki* teaches or suggests that the edge judgment circuit cancels the discriminated edge direction when the density level of a pixel adjacent to the target pixel in the edge direction is larger than a threshold value.

Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 4 and 20.

Application No. 09/408,366  
Attorney's Docket No. 018775-765  
Page 7

In the event there are any questions concerning this response, or the application in general, the Examiner is respectfully requested to telephone the undersigned attorney so that prosecution of the application may be expedited.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: William C. Rowland  
William C. Rowland  
Registration No. 30,888

P.O. Box 1404  
Alexandria, Virginia 22313-1404  
(703) 836-6620

Date: April 24, 2003

**CERTIFICATE OF TRANSMISSION**

I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office Fax. No. (703) 872-9314 on April 24, 2003.

By: William C. Rowland  
William C. Rowland  
Registration No. 30,888

Date: April 24, 2003